Introduction
How is the most widely recognised product in the world made? How are the required quality standards met for every single unit of that product?
This case study answers these questions by outlining the manufacturing processes for Coca-Cola - the most widely recognised global brand from London to Lagos, Los Angeles to Lahore. It is sold in more and more markets, creating thousands of new jobs in the local economies.
The brand is owned by The Coca-Cola Company which works with franchisees across the world. These franchisees perform the bottling and canning operations and are also known as packagers.

This illustration shows how manufacturing operations convert inputs into finished outputs. Coca-Cola's bottlers and canners are concerned with a range of processes involved in transforming resources into the bottles and cans of drink that we are familiar with.
There is a difference between transforming resources and transformed resources:
- The transforming resources are the managers, employees, machinery and equipment used by The Coca-Cola Company and its franchisees.
- The transformed resources are the materials (the cans, bottles, liquids, etc.) and the information which are processed to create the finished product.

Manufacturing Coca-Cola
Primarily, Coca-Cola is manufactured by franchisees who are the world's leading bottling and canning companies. This franchise business is strictly controlled by The Coca-Cola Company.
Soft drinks manufacture is a competitive business. Manufacturing techniques are continually improved. This helps meet the highest quality standards for its products using the most cost-effective production techniques. For example, very small changes in the shape of the can could save a canning factory millions of dollars in production costs.
The production of Coca-Cola involves two major operations:
- creating the packaging material
- bottling and canning the finished drink.

Packaging
For many years, Coca-Cola was produced in glass bottles. Because of the high cost of distributing bulky bottles, they had to be manufactured close to where the bottling took place. Today, this is no longer so important since new packaging methods have revolutionised the process.
Advanced bottling and canning technology makes Coca-Cola cans and bottles very light but extremely strong. The Company has invested a lot of time and money in research and development to ensure the most effective life cycle impact of its packaging.
By using the minimum quantities of materials in packaging, the cans and plastic bottles are simple to crush or to reprocess at the end of the initial life cycle.

Preparing to fill cans
Cans are delivered in bulk to a canning plant. At this stage the cans are shaped like an open cup ready to receive the liquid drink. They are not fully formed because the ring pull end has still to be fitted.
After they have been inspected to check that there are no faults, each can goes through a rinsing machine to make sure it is clean and ready for filling.
Preparing the drink

Coca-Cola consists of a concentrated beverage base and a liquid sweetener which are combined to form the syrup from which the drink is made. The Company ships the concentrate to bottling and canning plants where the franchisees mix it with sugar and local water. The water is passed through a number of filters to make sure it is absolutely pure.

Carbon dioxide, which makes it fizzy, is also delivered to the canning plant where it is stored and then piped into the manufacturing process through a carbonator and cooler. The Company specifies what equipment franchisees will use to carry out these processes.

Samples are taken regularly for chemical analysis, and staff make frequent spot checks to ensure that plants are maintaining the Company’s standards of cleanliness and quality. The Company provides its franchisees with the most up-to-date technology available and many of them use the latest computer technology and statistical process control methods.

Filling the cans

The packaging and the finished drink are combined by a rapid filling process. Every minute hundreds of cans pass along an automated production line and are filled with a precise amount of Coca-Cola. As the cans move along the production line, they are seamed to include the ring pull end and produce the finished can. The ends are inspected to make sure they are smooth and do not have any gaps or leaks.

An individual code is stamped on the cans so that each one can be traced back to the point and time of production. A date code ensures product freshness. The cans now look like those you will see in the shops.

Guaranteeing the quality of the product

The manufacture of Coca-Cola is carried out by a set of processes called continuous flow production. On a production line, a process is continually repeated and identical products go through the same sequence of operations. Continuous flow production takes this one step further by using computer-controlled automatic equipment to produce goods 24 hours a day.

The Company and its franchisees use Total Quality Management procedures that encourage everyone in the plant to think about quality in everything they do. Every employee sets out to satisfy customers and places them at the heart of the production process. By continually seeking to improve every aspect of production, employees are able to eliminate problems.

Throughout the production process, quality control personnel monitor the product and take test samples. To guarantee that there are no errors, quality control inspectors take statistically selected samples at the end of the production line.

Using chemical analysis, these inspectors can guarantee that the product meets the exact specifications; they also check that there are no faults in the packaging. A ‘fill height detector’ uses an electronic eye to ensure that the cans are filled to the right quantity. Cans that are not properly filled are rejected.

Packing the end product into cases

The canners then prepare the cans for distribution to retailers such as supermarkets, shops and garages. A machine called a case former creates the casing that protects the cans as they are sorted onto pallets. The cans are stored temporarily in a warehouse before they are collected by large distribution trucks.
Bottling Coca-Cola

So far this case study has focused on the canning process for Coca-Cola. The bottling process, whether in glass or PET (plastic), is very similar. Each plastic bottle starts as test-tube size and is blown up like a balloon into the final bottle shape. Whereas franchisees receive cans that already have the logo and any promotional details on them, bottlers apply the labels from large reels once the bottles have been formed. At the end of the bottling line, bottles are automatically sealed with a cap immediately after they have been filled.

Just-in-time

Canners and bottlers process vast quantities of materials each week. Receiving the raw materials and delivering the finished products involves a complex sequence of actions. The ideal solution is to make sure that the inputs for the process arrive 'just-in-time' so they can be transformed into a finished product ready for transportation 'just-in-time' to meet the needs of the retailers. At modern canning plants, the can maker is often located in an adjoining facility, with delivery through a 'hole in the wall' operation. The packagers are involved in sophisticated supply chain networks with the supermarket chains and other outlets to ensure that this process runs smoothly. Canners and bottlers must ensure that they do not build up large stockpiles of cans waiting to be sold but they must also make sure that deliveries are not late. This is where they benefit from advanced information technology that rapidly relays figures about the demand for Coca-Cola. For example, this demand usually rises in periods of hotter weather so the packagers need to plan increased production. Canners and bottlers work closely with The Coca-Cola Company and other suppliers to provide a smooth running supply chain so that consumers are always within 'an arm's reach of desire' and can always buy a drink when they want one.

Performance feedback to canners and bottlers

In addition to each canner or bottler's own quality assurance procedures, sample bottles and cans from each market are tested regularly by The Coca-Cola Company. The results are then reported back to the packagers. This feedback helps The Coca-Cola Company and the franchisee to work together and identify opportunities for improvement. Franchisees undergo constant training and retraining in quality assurance, and can always ask for help and advice about ongoing improvement.

Conclusion

To produce the world's best known product, The Coca-Cola Company has to employ the highest quality processes and establish standards which guarantee the production of a standardised product which meets consumers' high expectations each and every time they drink a bottle or can of Coca-Cola. In order to guarantee these standards the Company has had to develop a close relationship with its franchisees based on a mutual concern for quality. Total Quality Management lies at the heart of this process involving a continuous emphasis on getting quality standards right every time and on continually seeking new ways to improve performance.